

**AMENDMENTS TO THE CLAIMS**

*The following listing of claims replaces all prior versions and listings of claims in this application.*

**Listing of claims:**

1. (Original) A projection-type rotary encoder having a light source, an object grating plate in which a substantially fan-shaped object grating for transmitting light is arranged at constant angular intervals in a circumferential direction, a main scale plate in which a substantially fan-shaped scale grating for transmitting light is arranged at constant angular intervals in a circumferential direction, and a photodiode grating plate in which a substantially fan-shaped photodiode photosensitive surface grating is arranged at constant angular intervals in a circumferential direction, whereby light emitted from the light source passes through the object grating and main scale plate and is received by the photodiode photosensitive surface grating; wherein

the main scale plate has the scale grating formed with a shape and size that correspond to a light image of the object grating incident on a surface thereof; and

the photodiode grating plate has the photodiode photosensitive surface grating formed with a shape and size that correspond to a light image of the scale grating incident on a surface thereof.

2. (Original) The projection-type rotary encoder according to claim 1, wherein

an external peripheral side of the scale grating is set to have the same width as that of an external peripheral side of the object grating, and is positioned at a

location where the external peripheral side of the object grating is moved outwardly along a radial line in parallel fashion by a first distance, the radial line being passing through a center of the main scale plate,

an external peripheral side of the photodiode photosensitive surface grating is set to have the same width as that of the external peripheral side of the object grating, and is positioned at a location where the external peripheral side of the object grating is moved outwardly along the radial line in parallel fashion by a distance twice the first distance,

an internal peripheral side of the scale grating is set to have the same width as that of an internal peripheral side of the object grating, and is positioned at a location where the internal peripheral side of the object grating is moved inwardly along the radial direction in parallel fashion by the first distance, and

an internal peripheral side of the photodiode photosensitive surface grating is set to have the same width as that of the internal peripheral side of the object grating, and is positioned at a location where the internal peripheral side of the object grating is moved inwardly along the radial direction in parallel fashion by a distance twice the first distance.

3. (Currently Amended) A projection-type reflecting rotary encoder having a light source, a main scale plate in which a scale grating consisting of a substantially fan-shaped reflecting grating for reflecting light is arranged at constant angular intervals in a circumferential direction, and a grating plate disposed between the light source and the main scale plate; and also having, in the part of the grating plate that faces the scale grating, wherein

a substantially fan-shaped object grating for transmitting light is formed in part of the grating plate where the scale grating is faced, and is arranged at constant angular intervals in a circumferential direction,

a substantially fan-shaped photodiode photosensitive surface grating is formed on a radialley outer position of the object grating and/or on a radialley inner portion thereof, and is arranged at constant angular intervals in a circumferential direction,

the scale grating of the main scale plate is formed to have a shape and size that correspond to a light image of the object grating incident on the surface thereof, and

the photodiode photosensitive surface grating of the grating plate is formed to have a shape and size that correspond to a reflected light image of the scale grating incident on the surface thereof.

4. (Original) The projection-type rotary encoder according to claim 3, wherein

an external peripheral side of the scale grating is set to have the same width as that of an external peripheral side of the object grating, and is positioned at a location where the external peripheral side of the object grating is moved outwardly along a radial line in parallel fashion by a first distance, the radial line passing through a center of the main scale plate,

an external peripheral side of the photodiode photosensitive surface grating is set to have the same width as that of the external peripheral side of the object grating, and is positioned at a location where the external peripheral side of the

object grating is moved outwardly along the radial line in parallel fashion by a distance twice the first distance,

an internal peripheral side of the scale grating is set to have the same width as that of an internal peripheral side of the object grating, and is positioned at a location where the internal peripheral side of the object grating is moved inwardly along the radial direction in parallel fashion by the first distance, and

an internal peripheral side of the photodiode photosensitive surface grating is set to have the same width as that of the internal peripheral side of the object grating, and is positioned at a location where the internal peripheral side of the object grating is moved inwardly along the radial direction in parallel fashion by a distance twice the first distance.